

AMENDMENTS TO THE CLAIMS

The following listing of claims will replace all prior versions and listings of claims in the application.

LISTING OF CLAIMS

1. (Currently Amended) A process for determining the quality of a weld, the process comprising:

- (a) measuring a welding parameter over a specified time;
- ~~(b) comparing a tolerance curve and the parameter;~~
- ~~(c) (b) generating a measurement curve from the measuring;~~
- ~~(d) (c) smoothing the measurement curve;~~
- ~~(e) (d) creating a tolerance curve based on [[the]] a smoothed measurement curve;~~
- ~~(f) (e) determining a difference between the tolerance curve and the parameter measurement curve; and~~
- ~~(g) (f) evaluating the weld quality based on the difference.~~

2. (Cancelled).

3. (Original) The process of Claim 2, wherein the specified time is between about 100 μ s and 1000 μ s.

4. (Original) The process of Claim 2, wherein the specified time is between about 200 μ s and 500 μ s.

5. (Currently Amended) The process of Claim 2, further comprising comparing the measurement curve to the tolerance curve to determine a disturbance.

6. (Original) The process of Claim 5, further comprising evaluating the disturbance to determine weld quality.

7. (Original) The process of Claim 5, wherein the disturbance is a high frequency disturbance.

8. (Currently Amended) The process of Claim 1, further comprising smoothing the measurement curve by means of a low pass filter.

9. (Original) The process of Claim 8, wherein the filter has a band pass between about 20 Hz and about 400 Hz.

10. (Original) The process of Claim 8, wherein the filter has a band pass between about 50 Hz and about 250 Hz.

11. (Currently Amended) The process of Claim 1, further comprising generating at least one of the tolerance curves above and below the ~~smoothed~~ measurement curve.

12. (Cancelled).

13. (Currently Amended) A welding method for welding an element to a component using a feed unit and a welding head, the method comprising:

- (a) feeding the element from the feed unit to the welding head;
- (b) energizing the welding head;
- (c) welding the element to the component;
- (d) measuring a welding parameter during welding;
- (e) generating a measurement curve from the measuring;
- (f) smoothing the measurement curve;
- (g) creating a tolerance curve based on ~~[[the]]~~ a smoothed measurement curve;
- ~~(h) comparing the tolerance curve and the parameter;~~
- ~~(i) (h)~~ (h) determining a difference between the tolerance curve and the ~~parameter~~ measurement curve; and
- ~~(j) (i)~~ (i) evaluating the weld quality based on the difference.

14. (Currently Amended) The process of Claim 13, ~~further comprising continually measuring, comparing and evaluating the parameter wherein the measuring~~ a welding parameter during welding is over a specified time.

15. (Currently Amended) The ~~process~~ method of Claim 14, wherein the specified time is between about 100 μ s and 1000 μ s.

16. (Currently Amended) The ~~process~~ method of Claim 15, wherein the specified time is between about 200 μ s and 500 μ s.

17. (Currently Amended) The ~~process~~ method of Claim 13, further comprising smoothing the measurement curve by means of a low pass filter.

18. (Currently Amended) The ~~process~~ method of Claim 17, wherein the filter has a band pass between about 20 Hz and about 400 Hz.

19. (Currently Amended) The ~~process~~ method of Claim 17, wherein the filter has a band pass between about 50 Hz and about 250 Hz.

20. (Currently Amended) The ~~process~~ method of Claim 14, further comprising comparing the measurement curve to the tolerance curve to determine disturbances.

21. (Currently Amended) The ~~process~~ method of Claim 20, further comprising evaluating the disturbance to determine weld quality.

22. (Currently Amended) The ~~process~~ method of Claim 21, wherein the disturbance is a high frequency disturbance.

23. (Currently Amended) The ~~process~~ method of Claim 13, further comprising generating tolerance curves above and below the smoothed measurement curve.

24. (Currently Amended) The ~~process~~ method of Claim 13, wherein the parameter is arc voltage.

25. (Currently Amended) A welding method for welding an element to a component using a feed unit and a welding head and ensuring weld quality, the method comprising:

- (a) feeding the element from the feed unit to the welding head;
- (b) lifting the element to a height along a substantially linear path in relation to the component;
- (c) energizing the welding head;
- (d) welding the element to the component;
- (e) measuring a welding parameter during welding for a specified time;
- (f) generating a measurement curve;
- (g) smoothing the measurement curve using a low pass filter creating a smoothed measurement curve;
- (h) creating a tolerance curve based on a specified tolerance above and below the smoothed measurement curve;
- ~~(i) comparing a tolerance curve and the measurement curve;~~
- ~~(j)~~ (i) sensing a difference between the tolerance curve and the measurement curve;
- ~~(k)~~ (j) evaluating the weld quality based on the difference;
- ~~(l)~~ (k) retracting the element in relation to the component; and
- ~~(m)~~ (l) stopping energy to the welding head.

26. (Currently Amended) The ~~process~~ method of Claim 25 further comprising comparing the measurement curve to the tolerance curve to determine disturbance.

27. (Currently Amended) The ~~process~~ method of Claim 26, further comprising evaluating the disturbance to determine weld quality.

28. (Currently Amended) The ~~process~~ method of Claim 26, wherein the disturbance is a high frequency disturbance.

29. (Currently Amended) The ~~process~~ method of Claim 25, further comprising smoothing the measurement curve by means of a low pass filter.

30. (Currently Amended) The ~~process~~ method of Claim 29, wherein the filter has a band pass between about 20 Hz and about 400 Hz.

31. (Currently Amended) The ~~process~~ method of Claim 29, wherein the filter has a band pass between about 50 Hz and about 250 Hz.

32. (Currently Amended) The ~~process~~ method of Claim 25, wherein the specified time is between about 100 μ s and 1000 μ s.

33. (Currently Amended) The ~~process~~ method of Claim 29, wherein the specified time is between about 200 μ s and 500 μ s.

34. (Currently Amended) The ~~process~~ method of Claim 25, wherein the parameter is arc voltage.

35. (Currently Amended) A welding system for welding ~~[[a]]~~ an element to a component, the system comprising:

(a) a welding head operably initially moving the element in relation to the component and later returning the element;

(b) a measurer operable measuring at least one welding parameter;

(c) a power supply operably providing power for creating an arc between the component and the element;

(d) a controller operably controlling the welding head and determining weld quality based on the measured parameter by generating a measurement curve from the measuring, smoothing the measurement curve, creating a tolerance curve based on the smoothed measurement curve and detecting a difference between the tolerance curve and ~~the parameter~~ a smoothed measurement curve; and

(e) an analyzer operable evaluating arc voltage and controlling the power supply.

36. (Original) The system of claim 35, wherein the element is a metal stud and the component is a metal sheet.

37. (Original) The system of claim 36, wherein the metal stud and the metal sheet are parts of a motor vehicle.

38. (Original) The system of Claim 35, further comprising a user interface operably controlling the system.

39. (Original) The system of Claim 38, wherein the user interface displays welding parameters.

40. (Original) The system of Claim 35, further comprising an electric motor operably lifting and lowering the element.

41. (Original) The system of Claim 35, wherein the system includes multiple welding heads.

42. (Original) The system of Claim 35, wherein the element is arc welded to the component by the welding head.

43. (Original) The system of Claim 35, further comprising an analysis device operably evaluating arc voltage and controlling power supply, based on feedback from arc voltage evaluation.

44. (New) The process of Claim 1, further comprising generating feedback based on the evaluating the weld quality.

45. (New) The method of Claim 13, further comprising generating feedback based on the evaluating the weld quality.